U.S. AIR FORCE

On the Home Stretch

The last segment of this briefing covers ----

- More about LEED and how it is evolving
- Tools and Technical Support for applying LEED and the six sustainable development principles to your projects

Current and Future LEED™

U.S. AIR FORCE

The current version, LEED 2.1, has been re-named LEED™ for New Construction (LEED-NC)

New LEED™ product development includes

- **LEED for Existing Buildings (LEED-EB)**
- **LEED for Commercial Interiors (LEED-CI)**
- **LEED for Core & Shell (LEED-CS)**
- **LEED for Neighborhood Developments (LEED-ND)**
- **LEED Homes**
- **LEED-NC Version 3.0**

U.S. AIR FORCE

Structure of the LEED™ Credits

Each credit identifies the following:

- **Intent -** *The performance basis for the requirement*
- **Requirements –** *Actions needed to earn the credit*
- **Submittals** - *Documentation required by USGBC*
- **Technologies and Strategies -** *Recommended practices to fulfill the requirement and earn the points for that credit*

Structure of the LEED™ Credits

There are also several mandatory prerequisites that must be achieved <u>before</u> earning any credits

- Some prerequisites are defined by USGBC
- The AF has added some prerequisites to ensure compliance with laws affecting Federal projects, such as NEPA and cultural resource protection
- These are in the AF Sustainable Facilities Guide www.afcee.brooks.af.mil/dc/dcd/arch/rfg/index.html

U.S. AIR FORCE

LEED™ Scoring System

Credits	Points	Category
7	None	Prerequisites
8	14	Sustainable Sites
3	5	Water Efficiency
6	17	Energy and Atmosphere
7	13	Materials and Resources
8	15	Indoor Environmental Quality
--	4	Process and Innovation
--	1	Use a LEED Professional

69 TOTAL POINTS AVAILABLE

26 points = LEED™ Certified; 33 points = Silver; 39 points = Gold; 52 points = Platinum

U.S. AIR FORCE

LEED-NC Fee Summary

	Less than 75,000 SF	75,000 – 300,000 SF	More than 300,000 SF
	Fixed Rate	Based on Square Ft.	Fixed Rate
Registration			
Members	$750.00	$0.01 per SF	$3,000.00
Non-Members	$950.00	$0.0125 per SF	$3,750.00
Certification			
Members	$1,500.00	$0.02 per SF	$6,000.00
Non-Members	$1,875.00	$0.025 per SF	$7,500.00

U.S. AIR FORCE

LEED-NC Certification Process

- **Step 1: Project Registration**
  - Gain access to LEED™ Letter Templates (version 2.1), Credit Inquiries and Rulings (CIR), and on-line project listing
- **Step 2: Prepare Documentation**
  - Compile on CD for LEED 2.1
- **Step 3: Building Certification**
  - Upon documentation submittal / USGBC review

Air Force policy: MILCON projects will be *certifiable*, but not necessarily be *certified*

U.S. AIR FORCE

LEED-NC is Evolving

- **Version 2.1 streamlined the application process**
- **Version 2.2 will fix known problems, clarify intent of selected credits, and clarify performance standards**
  - Balloting in 2004, rules will take effect in 2005

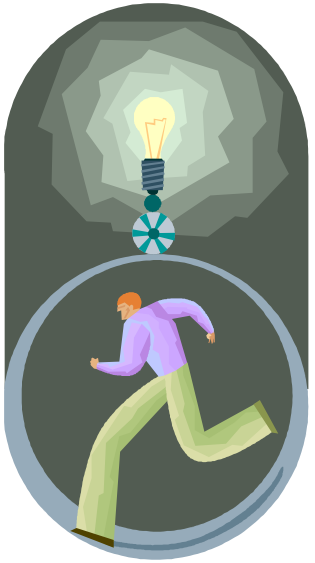
LEED-NC is Evolving

- **Version 3.0 will include "substantial differences"**
  - **It will incorporate Life Cycle Analysis - LCA (not to be confused with Life Cycle Costing)**
    - LCA is the analysis of the environmental impacts a product has, over its entire life cycle from resource extraction through manufacturing, transportation, use, and recycling or disposal
  - **No other decisions have been made since version 3 development is just beginning**
  - **It is expected to be released in 2005**

U.S. AIR FORCE

USGBC LEED™ Resources

- LEED™ Rating Systems
- Training Workshops
- Professional Accreditation
- Welcome Packet
- Reference Package
- Credit Inquiries and Rulings
- Website – www.leedbuilding.org
- Email – leedinfo@usgbc.org



Edit View Favorites Tools Help
Back Search Favorites Media
http://www.usgbc.org/leed/leed_main.asp
Go

- certification process
- register your project
- training workshops
- publications
- accreditation exam
- project list
- tsac
- cir
- leed system drafts

Leadership in Energy & Environmental Design

The LEED (Leadership in Energy and Environmental Design) Green Building Rating System™ is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. Members of the U.S. Green Building Council representing all segments of the building industry developed LEED and continue to contribute to its evolution. LEED standards are currently available or under development for:

- New commercial construction and major renovation projects (LEED-NC)
- Existing building operations (LEED-EB, Pilot version)
- Commercial interiors projects (LEED-CI, Pilot version)
- Core and shell projects (LEED-CS, Pilot version)
- Homes (LEED-H)

USGBC member committees are actively collaborating on new and existing LEED standards. Check for periodic LEED updates.

LEED was created to:

- define "green building" by establishing a common standard of measurement
- promote integrated, whole-building design practices
- recognize environmental leadership in the building industry
- stimulate green competition
- raise consumer awareness of green building benefits
- transform the building market

LEED provides a complete framework for assessing building performance and meeting sustainability goals. Based on well-founded scientific standards, LEED emphasizes state of the art strategies for sustainable site development, water savings, energy efficiency,

Done
Internet

Edit View Favorites Tools Help
Back Search Favorites Media
http://www.usgbc.org/LEED/publications.asp
Go

- certification process
- register your project
- training workshops
- publications
- accreditation exam
- project list
- tsac
- cir
- leed system drafts

EPA Science and Technology Center
Kansas EPA Laboratory, LLC
Kansas City, KS
LEED 2.0 Gold

Publications

LEED for New Construction and Major Renovations (LEED-NC)

- LEED-NC Rating System™ Version 2.1
- LEED-NC Version 2.1 Letter Templates
- LEED-NC Rating System Version 2.0
- LEED-NC Version 2.0 Documentation Requirements (Summary)
- LEED-NC Application Guide for Lodging
- LEED-NC Reference Package
- LEED-NC Reference Guide
- Frequently Asked Questions and Fact Sheets

LEED-NC Version 2.1 Rating System

Lists the intent, requirements, submittals, and technologies/strategies for each credit, and also includes the LEED-NC Checklist. An errata sheet lists corrections to the Rating System document. For California Title 24 equivalence referenced in Energy & Atmosphere credit 1, click here.

LEED-NC Version 2.1 Letter Templates

The LEED Letter Templates streamline preparation of LEED certification applications by providing pre-formatted submittal sheets for each prerequisite and credit. The Letter Templates outline the specific project data needed to demonstrate achievement of the LEED performance requirements and include calculation formulas where applicable. Applications for LEED certification must follow the process and format outlined in the Letter Templates. The Letter Templates are available for download by USGBC Web site users with access to the online reference guide or registered project welcome pages.

Done
Internet

U.S. AIR FORCE

Where are Criteria Published?

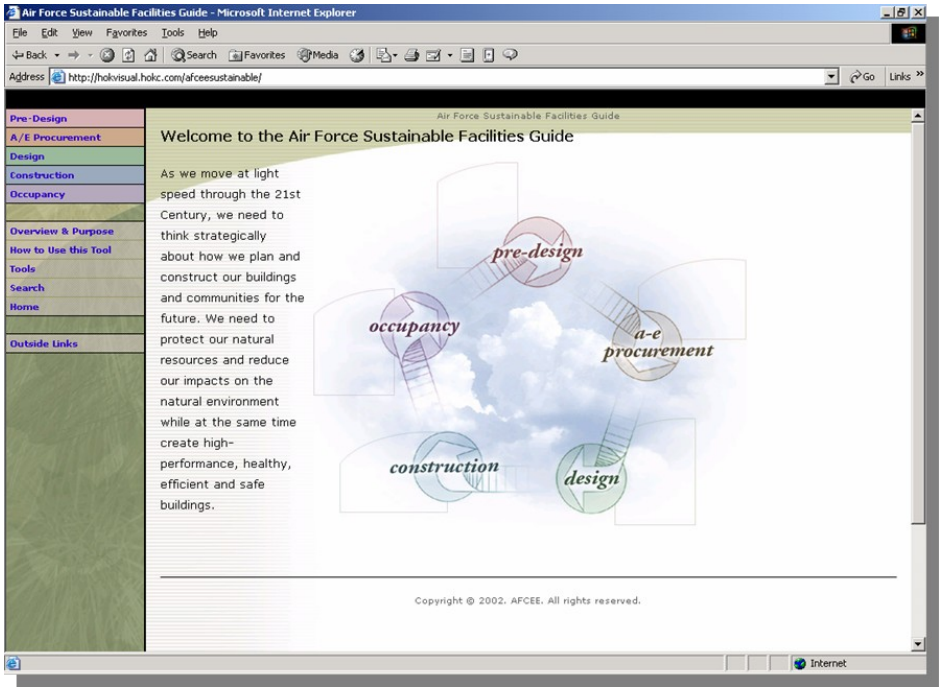
- **Air Force Design Guides and other tools are on AFCEE's website**
  - Sustainable Facilities Guide – *"process"*
- **Whole Building Design Guide is the portal for federal criteria documents**
  - Guide specs and *technical* resources

Air Force Sustainable Facilities Guide Demonstration

USAF Sustainable Facilities Guide

U.S. AIR FORCE

- Web-based
- *Process-focused* tools and resources for the entire life cycle
- Complements the Whole Building Design Guide (WBDG)
- Organized around the LEED™ Rating System


Air Force Sustainable Facilities Guide - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Address http://hokvisual.hokc.com/afceesustainable/
Pre-Design
A/E Procurement
Design
Construction
Occupancy
Overview & Purpose
How to Use this Tool
Tools
Search
Home
Outside Links
Air Force Sustainable Facilities Guide
Welcome to the Air Force Sustainable Facilities Guide
As we move at light speed through the 21st Century, we need to think strategically about how we plan and construct our buildings and communities for the future. We need to protect our natural resources and reduce our impacts on the natural environment while at the same time create high-performance, healthy, efficient and safe buildings.
pre-design
occupancy
a-e procurement
construction
design
Copyright © 2002. AFCEE. All rights reserved.
Internet

www.afcee.brooks.af.mil/dc/dcd/arch/rfg/index.h

Pre-Design
A/E Procurement
Design:
Concept Design; Design Development/ Documentation
Teams & Tools
Process Mapping
- 1. Sites
- 2. Water
- 3. Energy
- 4. Materials
- 5. IEQ
- 6. Innovation
Download (Entire Process Map)
Construction
Occupancy
Overview & Purpose
How to Use this Tool
Tools
Search
Home
Outside Links
Process Mapping Key
LEED™ decision
LEED™ documentation
Guidance

Design Phase

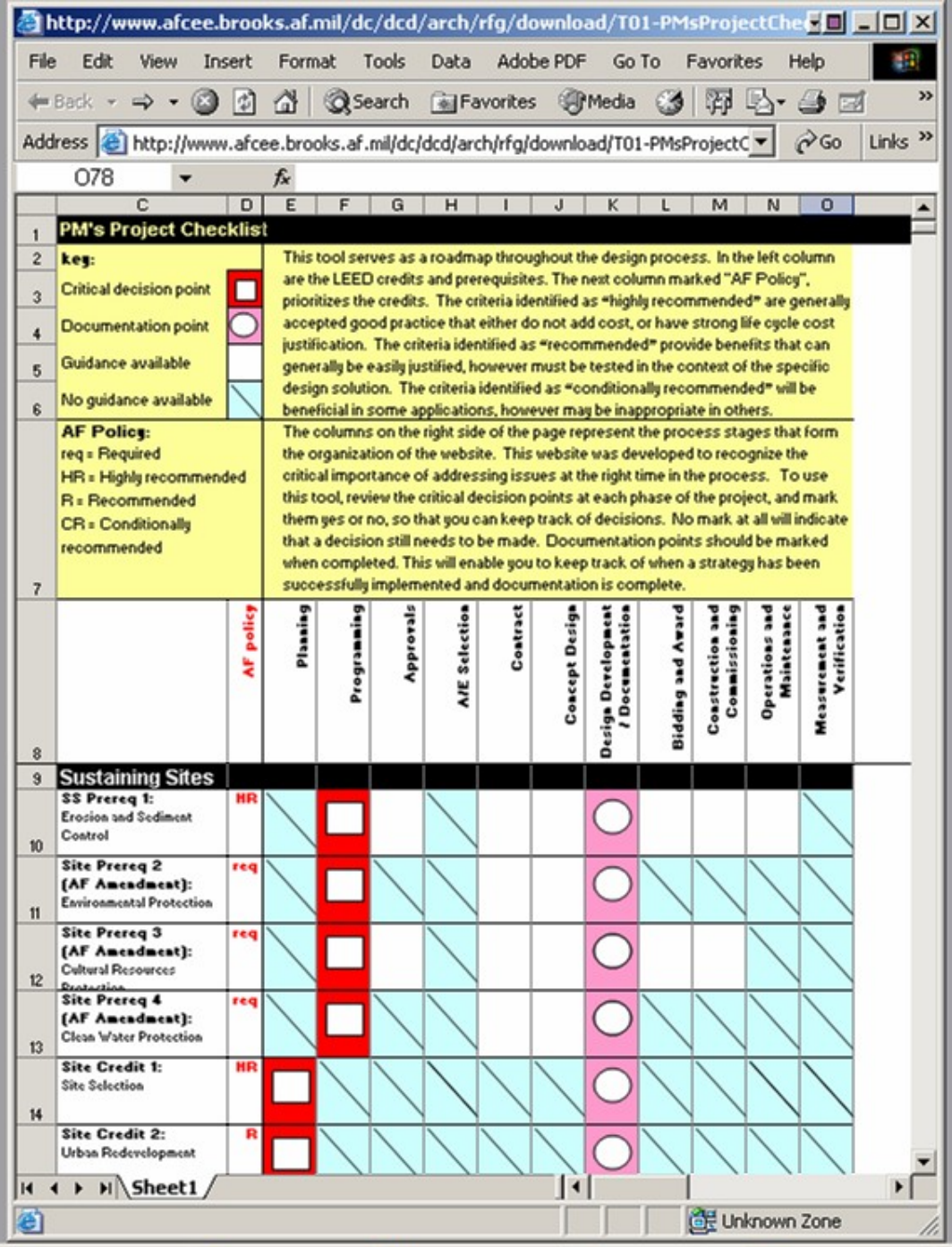
Teams

Concept Design
Concept design is typically developed through an intensive, cross-disciplinary session called a "charrette." This is led by the Architect/ Engineer contractor (A/E) and attended by the full Air Force team (engineers, planners, environmental flight, and facility managers) and all other design consultants. Issues include placement of the facility on the site, massing, orientation, plan organization, and definition of all major building systems. The A/E should set clear and specific sustainable design goals for the project using the LEED™ project checklist prior to the charrette session. As a deliverable at the end of the Concept Design phase, the A/E should document progress on meeting sustainable design goals in the **Sustainable Design Report**.

Design Development/Documentation
During Design Development & Documentation phase, each element of the final project is defined and documents are prepared for bid. The Architect/ Engineer contractor (A/E) should use energy modeling and daylighting analysis to refine the design, and life cycle cost analysis to provide a primary basis for decision making. Design reviews, which are provided by the Base Civil Engineer (BCE) and the AF PM, should take all sustainable design goals into consideration. As a deliverable at the end of the Design Development and Documentation phase, the A/E should document progress on meeting sustainable design goals in the **Sustainable Design Report**.

Tools

Tools	Process Stage
Sustainable Design Report Outline - Concept	Concept Design
Sustainable Design Report Outline - DD/CD	Design Development/Documentation
PM's Project Checklist	All
AF Amendment and Credit Justification	All
Commissioning Tool	All


http://www.afcee.brooks.af.mil/dc/dcd/arch/rfg/download/T01-PMsProjectChe
File Edit View Insert Format Tools Data Adobe PDF Go To Favorites Help
Back Search Favorites Media
Address http://www.afcee.brooks.af.mil/dc/dcd/arch/rfg/download/T01-PMsProjectC
Go Links
O78
PM's Project Checklist
Key:
Critical decision point
Documentation point
Guidance available
No guidance available
This tool serves as a roadmap throughout the design process. In the left column are the LEED credits and prerequisites. The next column marked "AF Policy", prioritizes the credits. The criteria identified as "highly recommended" are generally accepted good practice that either do not add cost, or have strong life cycle cost justification. The criteria identified as "recommended" provide benefits that can generally be easily justified, however must be tested in the context of the specific design solution. The criteria identified as "conditionally recommended" will be beneficial in some applications, however may be inappropriate in others.
AF Policy:
req = Required
HR = Highly recommended
R = Recommended
CR = Conditionally recommended
The columns on the right side of the page represent the process stages that form the organization of the website. This website was developed to recognize the critical importance of addressing issues at the right time in the process. To use this tool, review the critical decision points at each phase of the project, and mark them yes or no, so that you can keep track of decisions. No mark at all will indicate that a decision still needs to be made. Documentation points should be marked when completed. This will enable you to keep track of when a strategy has been successfully implemented and documentation is complete.
AF policy
Planning
Programming
Approvals
A/E Selection
Contract
Concept Design
Design Development / Documentation
Bidding and Award
Construction and Commissioning
Operations and Maintenance
Measurement and Verification
Sustaining Sites
SS Prereq 1: Erosion and Sediment Control
HR
Site Prereq 2 (AF Amendment): Environmental Protection
req
Site Prereq 3 (AF Amendment): Cultural Resources Protection
req
Site Prereq 4 (AF Amendment): Clean Water Protection
req
Site Credit 1: Site Selection
HR
Site Credit 2: Urban Redevelopment
R
Sheet1
Unknown Zone
Start
SD Training Co...
Air Force Sust...
Microsoft Pow...
http://www....
Microsoft Excel
10:55 AM

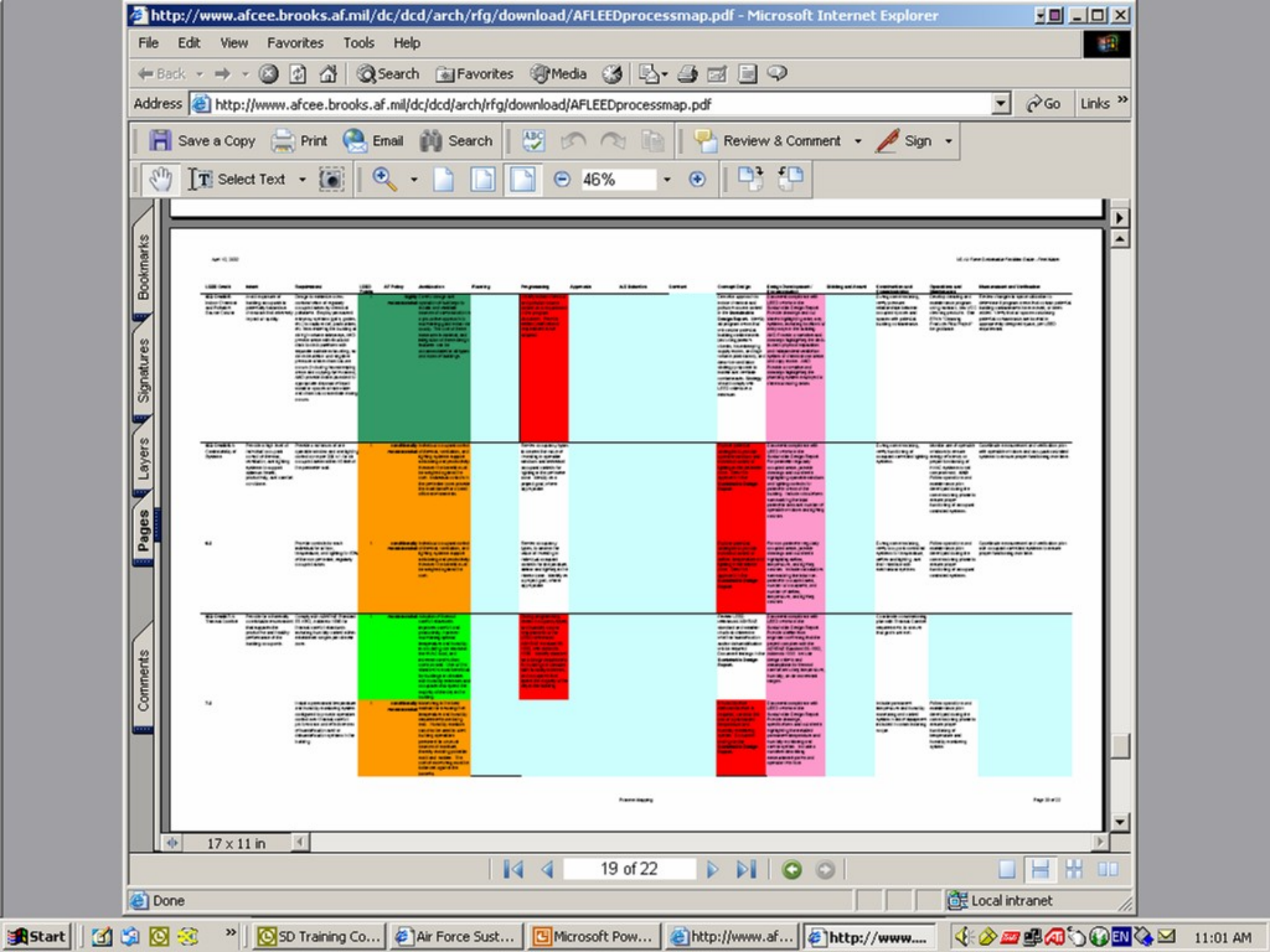
Pre-Design
A/E Procurement
Design:
Concept Design; Design Development/ Documentation
Teams & Tools
Process Mapping
- 1. Sites
- 2. Water
- 3. Energy
- 4. Materials
- 5. IEQ
- 6. Innovation
Download (Entire Process Map)
Construction
Occupancy
Overview & Purpose
How to Use this Tool
Tools
Search
Home
Outside Links
Process Mapping Key
LEED™ decision
LEED™ documentation
Guidance

Design: Process Mapping

2. Water Efficiency

<< 1. Sites 2. Water 3. Energy 4. Materials 5. IEQ 6. Innovation >>

LEED Credit	LEED Points	Air Force Policy	Concept Design	Design Development / Documentation
	5 total			
Water Credit 1.1 Water Efficient Landscaping	1	Highly Recommended	Explore potential for rainwater collection system, and develop life cycle cost analysis. **AND** Integrate landscape design with on-site stormwater retention and filtration strategies (e.g. landscaped areas at slightly depressed elevation can function as bioretention areas, collecting stormwater runoff, and reducing irrigation requirements). Discuss strategy for water-efficient landscaping in the **Sustainable Design Report**.	Document compliance with LEED™ criteria in appendix to the **Sustainable Design Report**: Provide cut sheets for high efficiency irrigation equipment, including calculations to demonstrate that potable water consumption for irrigation is reduced by 50%. **OR** Provide drawings and a narrative describing the captured rain system or recycled site water system with the capacity of the system highlighted, including calculations to demonstrate that potable water consumption for irrigation is reduced by 50%.
1.2	1	Recommended	Explore potential for rainwater collection system to cover 100% of landscape irrigation requirements, and develop life cycle cost analysis. **OR** Select native plantings that do not require irrigation. Discuss strategy for water-efficient landscaping in the **Sustainable Design Report**.	Document compliance with LEED™ criteria in appendix to the **Sustainable Design Report**: Provide drawings and a narrative describing the captured rain system or recycled site water system with the capacity of the system highlighted, including calculations to demonstrate that potable water consumption for irrigation is reduced by 100%. **OR** Provide a design narrative of the landscape design and describe why a permanent landscape irrigation system is not required.
Water Credit 2 Innovative Wastewater	1	Conditionally Recommended	Complete feasibility study(s) for innovative wastewater treatment and reuse systems prior to the design charrette. If commitment is made to pursue use of the technology further, include location of tanks and/or wetlands on the	Document compliance with LEED™ criteria in appendix to the **Sustainable Design Report**: Provide a narrative of measures implemented to reduce potable water/sewage conveyance. Include


http://www.afcee.brooks.af.mil/dc/dcd/arch/rfg/download/AFLEEDprocessmap.pdf - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.afcee.brooks.af.mil/dc/dcd/arch/rfg/download/AFLEEDprocessmap.pdf
Go Links
Save a Copy Print Email Search
Review & Comment Sign
Select Text
46%
Bookmarks
Signatures
Layers
Pages
Comments
17 x 11 in
19 of 22
Done
Local intranet
Start
SD Training Co...
Air Force Sust...
Microsoft Pow...
http://www.af...
http://www....
11:01 AM

Pre-Design
A/E Procurement
Design
Construction
Occupancy

Overview & Purpose
How to Use this Tool
Tools
Search
Home

Outside Links

Tools

Tools	Process Stage
PM's Project Checklist	All
AF Amendment and Credit Justification	All
Commissioning Tool	All
Project Sustainability Goals Checklist	Planning
1391 Checklist	Planning
EIAP Checklist	Approvals
A/E Selection Tool	A/E Selection
Statement of Work (SOW) Tool	Contract
Sustainable Design Report Outline - Concept	Concept Design
Sustainable Design Report Outline - DD/CD	Design Development/Documentation
Sustainable Design Report Outline - Construction	Construction
Construction Waste Management Tool	Construction
Measurement & Verification Tool	Measurement & Verification

Copyright © 2002. AFCEE. All rights reserved.

Pre-Design
A/E Procurement
Design
Construction
Occupancy
Overview & Purpose
How to Use this Tool
Tools
Search
Home
Outside Links

Outside Links

Whole Building Design Guide
The Whole Building Design Guide is a gateway site to up-to-date information on integrated "whole building" design techniques and technologies. The site is organized under three broad categories: Building Types, Design Objectives, and Products & Systems. The WBDG allows easy access to online information including design tools, federal mandates, government and non-government standards, and in-depth technical summaries.

The Whole building Design Guide website is found at: http://www.wbdg.org/

LEED Green Building Rating System
The LEED™ Green Building Rating System[trademark] is a priority program of the US Green Building Council. It is a voluntary, consensus-based, market-driven building rating system based on existing proven technology. It evaluates environmental performance from a "whole building" perspective over a building's life cycle, providing a definitive standard for what constitutes a "green building".

The LEED™ Green Building Rating System is found on the US Green Building Council website at: http://www.usgbc.org/

Energy Star Programs
Energy Star is a voluntary partnership between the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), product manufacturers, local utilities, and retailers. Partners help promote energy efficient products by labeling with the Energy Star logo and educating consumers about the benefits of energy efficiency. The "Energy Star for Federal Agencies" web site includes a directory of Energy Star products and providers, interactive tools and calculators; information on how to benchmark your building, and other technical resources.

The Energy Star Federal Programs web site is found at: http://yosemite1.epa.gov/estar/business.nsf/webmenus/Government/

ENERGY STAR®
ENERGY STAR® is a joint program of the DOE and the EPA. It supports DoD implementation of the energy conservation requirements in Executive Order 13123 and the Energy Policy Act. By choosing Energy Star-

Whole Building Design Guide Demonstration

WBDG - Whole Building Design Guide - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://www.wbdg.org/index.php Go Links

WBDG
Whole Building Design Guide

ABOUT WBDG | SITE MAP | SEARCH SITE: GO

- News, Events & Training
- Design Guidance
- Project Management
- Mandates / References

Subscribe to WBDG E-News

Browse the libraries of:

Construction Criteria Base

IHS

Welcome to the Whole Building Design Guide

A Building Professional's Gateway to Up-to-Date Information on Integrated, 'Whole Building' Design Techniques and Technologies

Participating Agencies:

GSA

NASA

National Institutes of Health

WBDG Focus On

Successful project management requires team leadership and coordination, diligent project planning, and effective oversight of the delivery process. Recognizing the importance of these qualities in satisfying clients' expectations, the Project Management section offers guidance for the entire

New FEMA Publications Available on WBDG

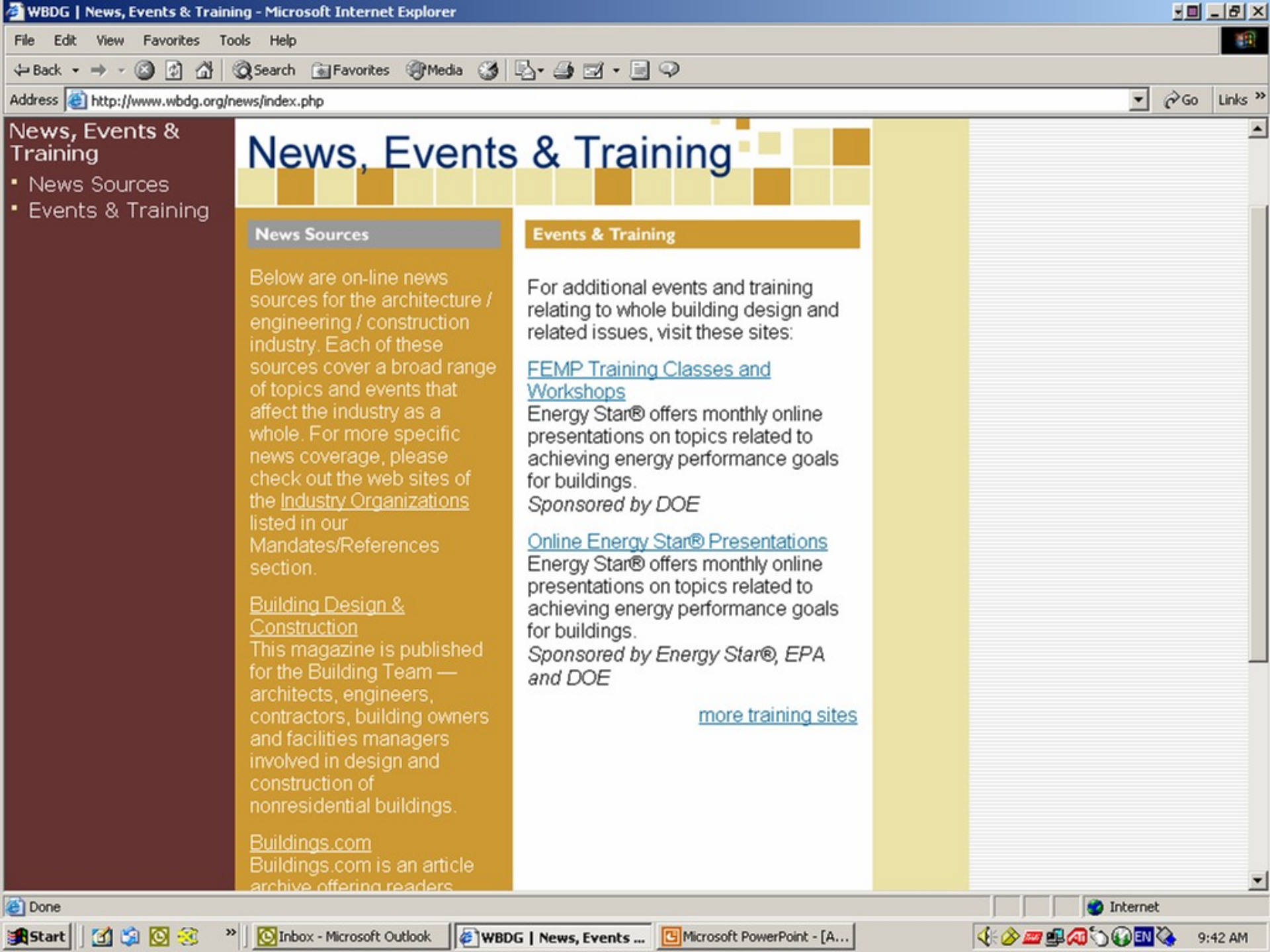
The FEMA Mitigation Division recently released its new series on Risk Management. View or download these documents from the Relevant Codes and Standards section of Provide Security for Building Occupants and Assets.

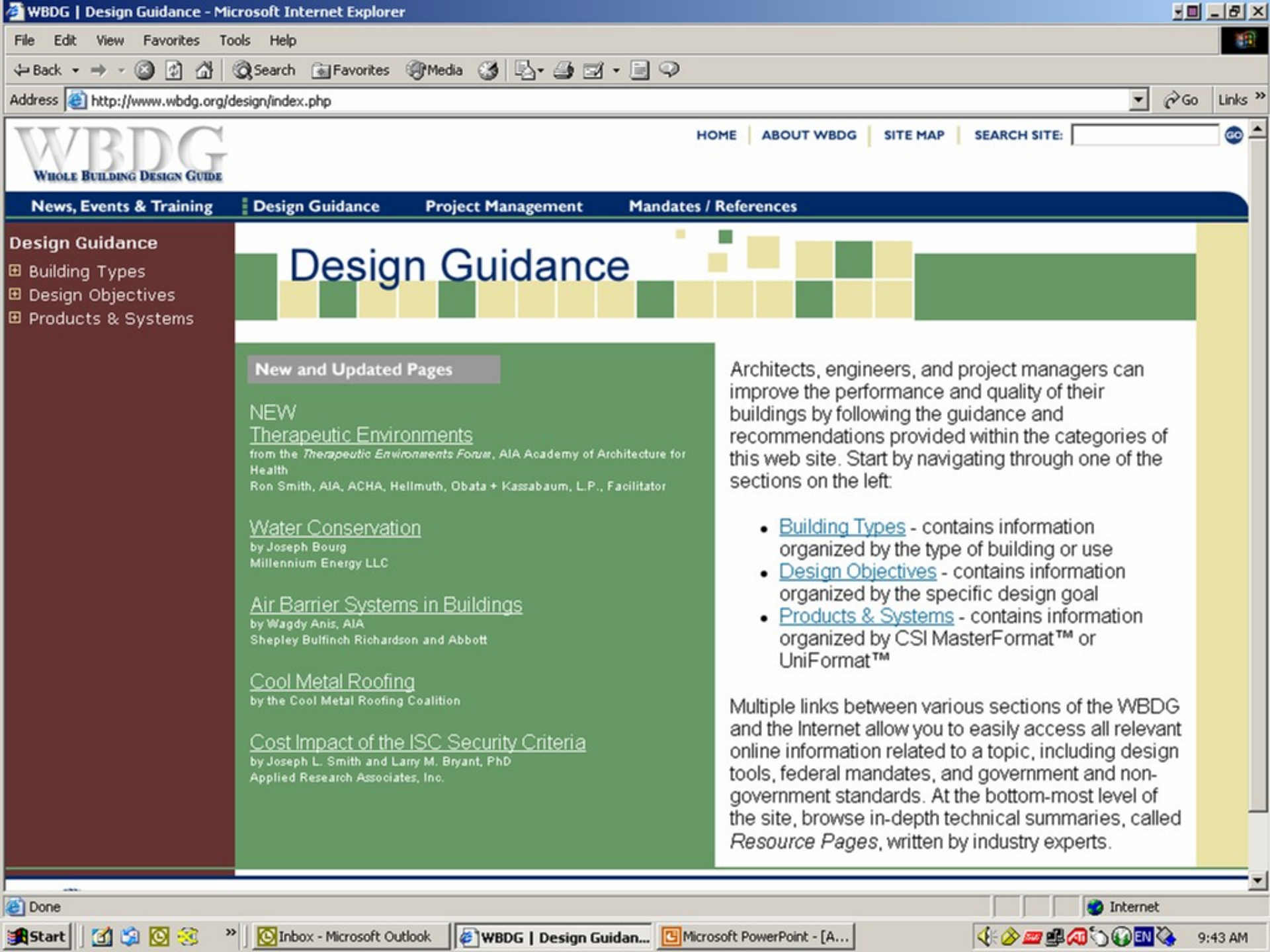
Coming Soon to WBDG

GSA LEED Cost Study—This major study for the U.S. General Services Administration will define costs

Internet

Start | Inbox - Microsoft Outlook | WBDG - Whole Building... | Microsoft PowerPoint - [A... | 9:59 AM


WBDG | News, Events & Training - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.wbdg.org/news/index.php
Go Links
News, Events & Training
News Sources
Events & Training
News, Events & Training
News Sources
Below are on-line news sources for the architecture / engineering / construction industry. Each of these sources cover a broad range of topics and events that affect the industry as a whole. For more specific news coverage, please check out the web sites of the Industry Organizations listed in our Mandates/References section.
Building Design & Construction
This magazine is published for the Building Team — architects, engineers, contractors, building owners and facilities managers involved in design and construction of nonresidential buildings.
Buildings.com
Buildings.com is an article
Events & Training
For additional events and training relating to whole building design and related issues, visit these sites:
FEMP Training Classes and Workshops
Energy Star® offers monthly online presentations on topics related to achieving energy performance goals for buildings.
Sponsored by DOE
Online Energy Star® Presentations
Energy Star® offers monthly online presentations on topics related to achieving energy performance goals for buildings.
Sponsored by Energy Star®, EPA and DOE
more training sites
Done
Internet
Start
Inbox - Microsoft Outlook
WBDG | News, Events ...
Microsoft PowerPoint - [A...
9:42 AM


WBDG | Design Guidance - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.wbdg.org/design/index.php
Go Links
WBDG
Whole Building Design Guide
HOME | ABOUT WBDG | SITE MAP | SEARCH SITE:
GO
News, Events & Training
Design Guidance
Project Management
Mandates / References
Design Guidance
Building Types
Design Objectives
Products & Systems
Design Guidance
New and Updated Pages
NEW
Therapeutic Environments
from the Therapeutic Environments Forum, AIA Academy of Architecture for Health
Ron Smith, AIA, ACHA, Hellmuth, Obata + Kassabaum, L.P., Facilitator
Water Conservation
by Joseph Bourg
Millennium Energy LLC
Air Barrier Systems in Buildings
by Wagdy Anis, AIA
Shepley Bulfinch Richardson and Abbott
Cool Metal Roofing
by the Cool Metal Roofing Coalition
Cost Impact of the ISC Security Criteria
by Joseph L. Smith and Larry M. Bryant, PhD
Applied Research Associates, Inc.
Architects, engineers, and project managers can improve the performance and quality of their buildings by following the guidance and recommendations provided within the categories of this web site. Start by navigating through one of the sections on the left:
Building Types - contains information organized by the type of building or use
Design Objectives - contains information organized by the specific design goal
Products & Systems - contains information organized by CSI MasterFormat™ or UniFormat™
Multiple links between various sections of the WBDG and the Internet allow you to easily access all relevant online information related to a topic, including design tools, federal mandates, and government and non-government standards. At the bottom-most level of the site, browse in-depth technical summaries, called Resource Pages, written by industry experts.
Done
Internet
Start
Inbox - Microsoft Outlook
WBDG | Design Guidan...
Microsoft PowerPoint - [A...
9:43 AM

Design Guidance

- Building Types
- Design Objectives
  - Accessible
  - Aesthetic
  - Cost-Effective
  - Functional
  - Productive
  - Secure / Safe
  - Sustainable
- Products & Systems

Design Guidance:

Design Objectives

Design Guidance

New and Updated Pages

Sustainable Pages Updated-

Optimize Site Potential
Minimize Energy Consumption
Protect and Conserve Water
Use Environmentally Preferable Products
Enhance Indoor Environmental Quality (IEQ)
Optimize Operational and Maintenance Practices
WBDG Sustainable Committee

Integrated Design

Each design objective described herein is significantly important, yet it is just one aspect of what it takes to achieve a successful project. A truly successful project is one where the interdependencies of all building systems are coordinated concurrently from the planning and programming phase. Further, all WBDG design objectives: accessible, aesthetic, cost effective, durable, functional, safe, and sustainable and their interrelationships must be understood, evaluated and appropriately applied. More

WBDG | Sustainable - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.wbdg.org/design/index.php?cn=3.8&cx=0
Go Links

Design Guidance
- Building Types
- Design Objectives
  - Accessible
  - Aesthetic
  - Cost-Effective
  - Functional/Operational
  - Historic Preservation
  - Productive
  - Secure/Safe
  - Sustainable
    - Optimize Site Potential
    - Minimize Energy Consumption
    - Protect and Conserve Water
    - Use Environmentally Preferable Products
    - Enhance Indoor Environmental Quality (IEQ)
    - Optimize Operational and Maintenance Practices
- Products & Systems

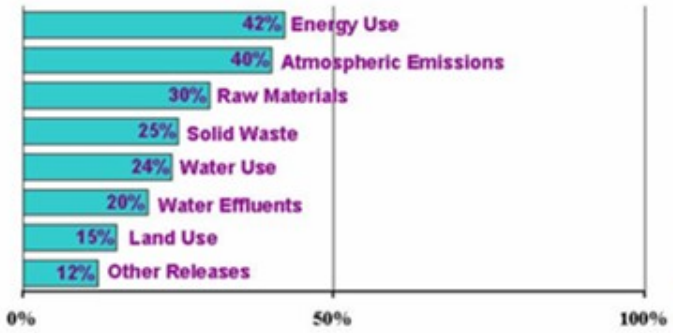
Sustainable

by the WBDG Sustainable Committee

Printable version | Email this article
View resource pages linked to this topic

OVERVIEW

Building construction and operation have an enormous direct and indirect impact on the environment, as illustrated in the figure below. As economy and population continue to expand, designers and builders face a unique challenge to meet demands for new and renovated facilities that are accessible, secure, healthy, and productive while minimizing their impact on the environment.



(Sources: Worldwatch Institute and U.S. EPA)

Done
Internet
Start Inbox - Microsoft Outlook WBDG | Sustainable - ... Microsoft PowerPoint - [A... 9:46 AM

WBDG | Use Environmentally Preferable Products - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://www.wbdg.org/design/index.php?cn=3.8.4&cx=0

Go Links

Design Guidance

- Building Types
- Design Objectives
  - Accessible
  - Aesthetic
  - Cost-Effective
  - Functional/Operational
  - Historic Preservation
  - Productive
  - Secure/Safe
  - Sustainable
    - Optimize Site Potential
    - Minimize Energy Consumption
    - Protect and Conserve Water
    - Use Environmentally Preferable Products
    - Enhance Indoor Environmental Quality (IEQ)
    - Optimize Operational and Maintenance Practices
- Products & Systems

Use Environmentally Preferable Products

by the WBDG Sustainable Committee

Printable version | Email this article

View resource pages linked to this topic

OVERVIEW

The composition of materials used in a building is a major factor in its life-cycle environmental impact. Federal facilities must lead the way in the use of environmentally preferable products and processes that do not pollute or unnecessarily contribute to the waste stream, do not adversely affect health, and do not deplete limited natural resources. As the growing global economy expands the demand for raw materials, it is no longer sensible to throw away much of what we consider construction waste. Using a "cradle-to-cradle" approach, the "waste" from one generation can become the "raw material" of the next.

Executive Order 13101, "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition," directs Federal agencies to use recycled content (see EPA's Comprehensive Procurement Guidelines and environmentally preferable products. When developing specifications, product descriptions and standards, agencies must consider a broad range of environmental factors including: waste prevention, recyclability, the use of recycled content, environmentally preferable, and bio-based products, life-cycle cost, and ultimate disposal.

During the facility design and development process, federal projects must have a comprehensive, integrated perspective that seeks to:

- Renovate existing facilities, products, and equipment whenever possible, such as historic structures or used furniture;
- Evaluate the environmental preferability of products using the cradle-to-cradle, life-cycle assessment (LCA) approach;
- Maximize the recycled content of all new materials, especially from a post-consumer perspective;
- Specify materials harvested on a sustained yield basis such as lumber from certified forests;

(1 item remaining) Opening page http://www.wbdg.org/design/index.php?cn=3.8.4&cx=0...

Internet

Start | Inbox - Microsoft Outlook | WBDG | Use Environm... | Microsoft PowerPoint - [A... | 9:47 AM

WBDG | Use Environmentally Preferable Products - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.wbdg.org/design/index.php?cn=3.8.4&cx=0
Go Links

RECOMMENDATIONS

Renovate Existing Facilities, Products, and Equipment

- Use reconditioned products and equipment, such as furniture, whenever economically feasible and resource efficient.
- Evaluate if components of existing buildings or facilities, such as windows or metal door frames, can be incorporated in any new construction. Ensure that the windows and doors meet the new facility's security and energy requirements.

Evaluate Environmental Preferability Using LCA

- Consider trade offs among multiple environmental impacts (e.g., global warming, resource depletion, indoor air quality) when determining environmental preferability. That is, look at the "big picture" rather than simply shifting problems from one impact to another. Employing LCA Tools like Athena and BEES can simplify the process and give more credible results. See WBDG Energy Analysis Tools.
- Consider trade offs among life-cycle stages (i.e., raw materials acquisition, manufacturing, transportation, installation, use, and waste management) when determining environmentally preferability. That is, look at the "big picture" rather than simply shifting problems from one life-cycle stage to another.

Maximize the Recycled Content of All New Materials

- Use EPA-designated recycled content products to the maximum extent practicable—required under the Resource Conservation and Recovery Act of 1994, Section 6002.
- Purchase environmentally preferable products as described in EPA's Environmentally Preferable Purchasing (EPP) Program, which promotes Federal Government procurement of products and services that have reduced impacts on human health and the environment over their life cycle.
- Follow the EPA's five guiding principles established to help Executive agencies identify and purchase environmentally friendly products and services.
    - Environment + Price + Performance = EPP. Include environmental considerations as part of the normal purchasing process.
    - Pollution Prevention. Emphasize pollution prevention as part of the purchasing process.
    - Life Cycle Perspective/Multiple Attributes. Examine multiple environmental attributes throughout the

(1 item remaining) Opening page http://www.wbdg.org/design/index.php?cn=3.8.4&cx=0...
Internet
Start Inbox - Microsoft Outlook WBDG | Use Environm... Microsoft PowerPoint - [A... 10:02 AM

WBDG | Use Environmentally Preferable Products - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.wbdg.org/design/index.php?cn=3.8.4&cx=0
Go Links

EMERGING ISSUES

Preferring Bio-based Products

Section 9002 of the Farm Security and Rural Investment Act of 2002 (Public Law 107-171, May 13, 2002) confers Federal purchasing preference to bio-based products on the basis of five criteria: environmental performance, cost performance, bio-based content, technical performance, and availability. In support of this legislation, a Federal rule is under development specifying that the USDA will establish a new "USDA Certified Bio-based Product" label. To qualify for the label, bio-based products must be evaluated for life-cycle environmental and cost performance by the NIST BEES tool.

RELEVANT CODES AND STANDARDS

Executive Order 13101, "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition"
ASTM E 2129—Standard Practice for Data Collection for Sustainability Assessment of Building Products
ISO 14040 Series—Life-Cycle Assessment Standards

MAJOR RESOURCES

Use Green Products

Choose Green Report—Various product recommendations by GreenSeal
Energy Star®, EPA
Environmental Building News
Environmental Design & Construction Magazine
Green Building Resource Guide by John Hermannsson. Taunton Press, 1997.
GreenSpec™—The Environmental Building News Product Directory
GSA Federal Supply Service Environmental Products and Services Guide
Guide to Resource Efficient Building Elements by Tracy Mumma. Missoula, MT: National Center for Appropriate Technology's Center for Resourceful Building Technology, 1997. eGuide version of book available online.
oikos® Green Building Source—Green product information

(1 item remaining) Opening page http://www.wbdg.org/design/index.php?cn=3.8.4&cx=0...
Internet
Start Inbox - Microsoft Outlook WBDG | Use Environm... Microsoft PowerPoint - [A... 10:02 AM

Design Guidance

- Building Types
- Design Objectives
  - Accessible
  - Aesthetic
  - Cost-Effective
  - Functional/Operational
  - Historic Preservation
  - Productive
  - Secure/Safe
  - Sustainable
    - Optimize Site Potential
    - Minimize Energy Consumption
    - Protect and Conserve Water
    - Use Environmentally Preferable Products
    - Enhance Indoor Environmental Quality (IEQ)
    - Optimize Operational and Maintenance Practices
- Products & Systems

Use Environmentally Preferable Products

by the WBDG Sustainable Committee

Printable version | Email this article

Green Products

View resource pages linked to this topic
Air Decontamination
Balancing Security/Safety and Sustainability Objectives
Building Integrated Photovoltaics (BIPV)
Electric Lighting Controls
Energy Efficient Lighting
Fuel Cell Technology
Green Products
High Performance HVAC
Indoor Environmental Quality
Life-Cycle Cost Analysis (LCCA)

OVERVIEW

The composition of materials used in a building is a major
facilities must lead the way in the use of environmentally pr
unnecessarily contribute to the waste stream, do not adver
resources. As the growing global economy expands the de
throw away much of what we consider construction waste.
one generation can become the "raw material" of the next.

Executive Order 13101, "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition," directs Federal agencies to use recycled content (see EPA's Comprehensive Procurement Guidelines and environmentally preferable products. When developing specifications, product descriptions and standards, agencies must consider a broad range of environmental factors including: waste prevention, recyclability, the use of recycled content, environmentally preferable, and bio-based products, life-cycle cost, and ultimate disposal.

During the facility design and development process, federal projects must have a comprehensive, integrated perspective that seeks to:

- Renovate existing facilities, products, and equipment whenever possible, such as historic structures or used furniture;
- Evaluate the environmental preferability of products using the cradle-to-cradle, life-cycle assessment (LCA) approach;
- Maximize the recycled content of all new materials, especially from a post-consumer perspective;
- Specify materials harvested on a sustained yield basis such as lumber from certified forests;

WBDG | Project Delivery and Controls - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.wbdg.org/project/index.php?cn=3&cx=0
Go Links

Project Planning, Management & Delivery
- Project Delivery Teams
- Project Planning and Development
- Project Delivery and Controls

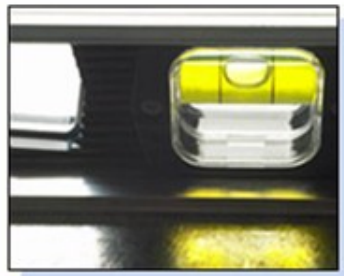
Project Delivery and Controls

by the WBDG Project Management Committee

Printable version | Email this article
View resource pages linked to this topic

OVERVIEW

Effective project management includes strategies, tactics, and tools for managing the design and construction delivery process and for controlling key factors to ensure the client receives a facility that matches scope and quality expectations, delivered on time and within budget. Successful project delivery requires implementation of management systems that will enable project delivery teams to control changes in the key factors of scope, costs, schedule, and quality.



Scope Management

Project scope is defined as the work that must be done to meet a client's program goals for space, function, features, and level of quality. In many ways, scope management is the foundation on which the other project elements are built. From project inception, project scope defines the boundaries within which the delivery team and the external stakeholders work. Effective scope management requires accurate definition of a client's requirements

Done
Internet
Start Inbox - Microsoft Outlook WBDG | Project Delive... Microsoft PowerPoint - [A... 9:52 AM

WBDG | Mandates/References - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://www.wbdg.org/ccbref/index.php Go Links

Mandates / References
- Federal Mandates
- Government Criteria
- Non-Government Standards
- Model Building Codes
- Case Studies
- Participating Agencies
- Industry Organizations
- Tools
- Related Links

Mandates / References

CONSTRUCTION CRITERIA BASE

Welcome to the CCB/References section. To view the CCB provided federal mandates, specifications or criteria referenced by this web site, please select from the categories to the left. You can also browse CCB by logging in below.

Browse the CCB Library!

Not a subscriber? Learn more...

Participating Agencies

Select a participating agency from the form below to view agency-specific information.

Select an agency... GO

Industry Organizations

Browse industry organization information by the first letter in the organization's name.

A B C D E F G H I K L M N O P R S T U V W

WBDG Affiliates

Codes, standards and catalogs Online Now! IHS

wiley.com lifelong learning

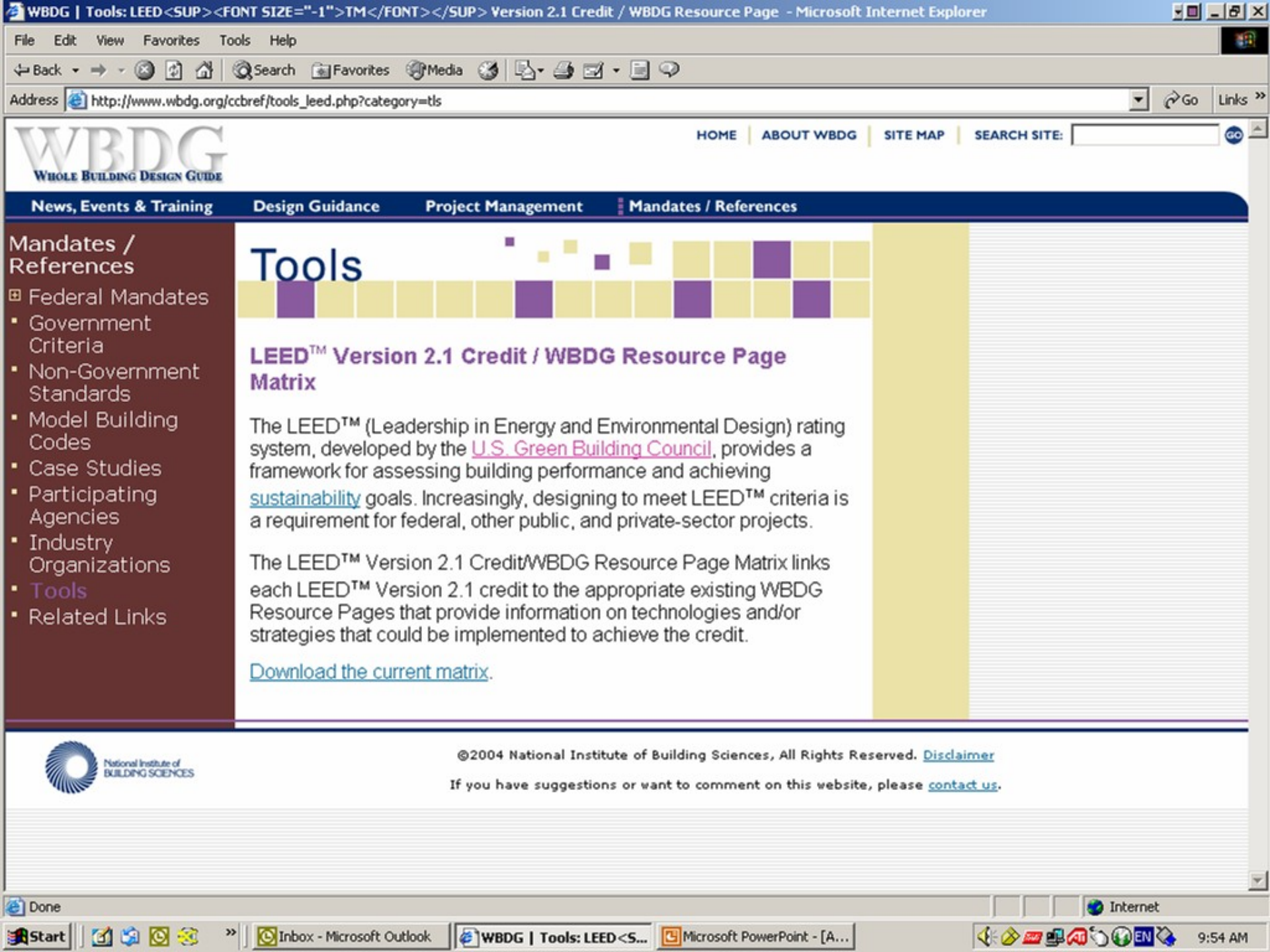
National Institute of Building Sciences

©2004 National Institute of Building Sciences, All Rights Reserved. Disclaimer

If you have suggestions or want to comment on this website, please contact us.

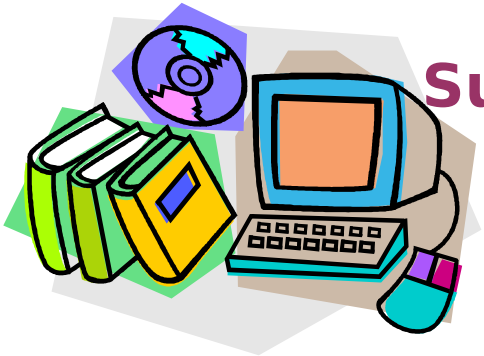
Done Internet

Start Inbox - Microsoft Outlook WBDG | Mandates/Re... Microsoft PowerPoint - [A... 9:53 AM


WBDG | Tools: LEED^{<FONT SIZE="-1">TM</FONT>} Version 2.1 Credit / WBDG Resource Page - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.wbdg.org/ccbref/tools_leed.php?category=tls
Go Links
WBDG
Whole Building Design Guide
HOME | ABOUT WBDG | SITE MAP | SEARCH SITE:
News, Events & Training
Design Guidance
Project Management
Mandates / References
Mandates / References
Federal Mandates
Government Criteria
Non-Government Standards
Model Building Codes
Case Studies
Participating Agencies
Industry Organizations
Tools
Related Links
Tools
LEED™ Version 2.1 Credit / WBDG Resource Page Matrix
The LEED™ (Leadership in Energy and Environmental Design) rating system, developed by the U.S. Green Building Council, provides a framework for assessing building performance and achieving sustainability goals. Increasingly, designing to meet LEED™ criteria is a requirement for federal, other public, and private-sector projects.
The LEED™ Version 2.1 Credit/WBDG Resource Page Matrix links each LEED™ Version 2.1 credit to the appropriate existing WBDG Resource Pages that provide information on technologies and/or strategies that could be implemented to achieve the credit.
Download the current matrix.
National Institute of Building Sciences
©2004 National Institute of Building Sciences, All Rights Reserved. Disclaimer
If you have suggestions or want to comment on this website, please contact us.
Done
Internet
Start
Inbox - Microsoft Outlook
WBDG | Tools: LEED<S...
Microsoft PowerPoint - [A...
9:54 AM

U.S. AIR FORCE

Web University Training



Sustainable Development Course is now offered at http://webu.brooks.af.mil/webu/

- Review of AF policy
- Introduction to LEED-NC Version 2
- Overview of key sustainable development strategies
- Discussion of implementation issues, teaming, integrated design process
- Introduction to Sustainable Facilities Guide

USAF: Sustainable Development Training Course - Microsoft Internet Explorer

Back Search Favorites Media

- Introduction
- Sustainable Development Introduction
- **Key Strategies:**
  - Sustaining Sites
  - Water Efficiency
  - Energy & Atmosphere
  - Materials & Resources
  - Indoor Environmental Quality (IEQ)
  - Operations
- **LEED™ Training:**
  - USGBC
  - Resources & Certification
- **Implementation Issues:**
  - Georgia Tech
- Download PDF Files
- Course Status
- How to Use this Site
- Resources & Links
- Home
- Design & Construction
- AFCEE

Welcome to the UNITED STATES AIR FORCE Sustainable Development Training Course

Welcome

It is Air Force policy to apply sustainable development concepts in the planning, design, construction, environmental management, operation, maintenance and disposal of facilities and infrastructure projects, consistent with budget and mission requirements. A sustainable facility achieves optimum resource efficiency and constructability while minimizing adverse impacts to the built and natural environments through all phases of its life cycle.

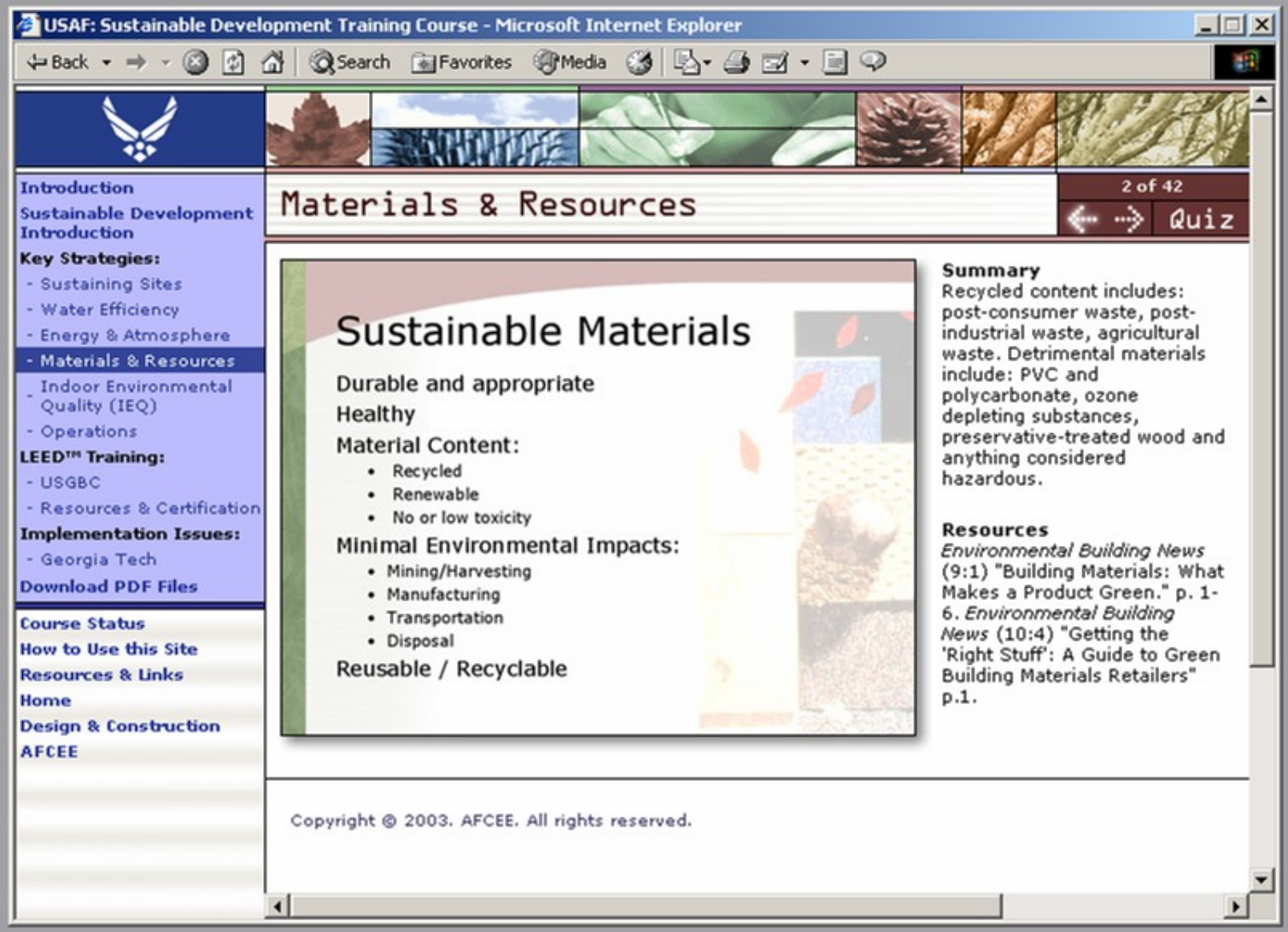
Air Force Policy Letter

Download PDF file (450k)

Purpose of Training

- Reduce the Life Cycle Cost of Air Force facilities and infrastructure.
- Reduce the environmental impact of Air Force facilities.
- Improve the building users' health and

Start | SD Training Cou... | Web University ... | Microsoft Powe... | RE: Username ... | USAF: Sustain... | 10:21 AM


USAF: Sustainable Development Training Course - Microsoft Internet Explorer
Back
Search
Favorites
Media
Introduction
Sustainable Development Introduction
Key Strategies:
- Sustaining Sites
- Water Efficiency
- Energy & Atmosphere
- Materials & Resources
- Indoor Environmental Quality (IEQ)
- Operations
LEED™ Training:
- USGBC
- Resources & Certification
Implementation Issues:
- Georgia Tech
Download PDF Files
Course Status
How to Use this Site
Resources & Links
Home
Design & Construction
AFCEE
Materials & Resources
2 of 42
Quiz
Sustainable Materials
Durable and appropriate
Healthy
Material Content:
• Recycled
• Renewable
• No or low toxicity
Minimal Environmental Impacts:
• Mining/Harvesting
• Manufacturing
• Transportation
• Disposal
Reusable / Recyclable
Summary
Recycled content includes: post-consumer waste, post-industrial waste, agricultural waste. Detrimental materials include: PVC and polycarbonate, ozone depleting substances, preservative-treated wood and anything considered hazardous.
Resources
Environmental Building News (9:1) "Building Materials: What Makes a Product Green." p. 1-6. Environmental Building News (10:4) "Getting the 'Right Stuff': A Guide to Green Building Materials Retailers" p.1.
Copyright © 2003. AFCEE. All rights reserved.
Start
SD Training Cou...
Web University ...
Microsoft Powe...
RE: Username ...
USAF: Sustain...
10:22 AM

USAF: Sustainable Development Training Course - Microsoft Internet Explorer

Back | Search | Favorites | Media

Introduction
Sustainable Development Introduction
Key Strategies:
- Sustaining Sites
- Water Efficiency
- Energy & Atmosphere
- Materials & Resources
- Indoor Environmental Quality (IEQ)
- Operations

LEED™ Training:
- USGBC
- Resources & Certification

Implementation Issues:
- Georgia Tech

Download PDF Files

Course Status
How to Use this Site
Resources & Links
Home
Design & Construction
AFCEE

Implementation Issues: Georgia Tech

Overview

- Top Ten barriers to sustainability identified by federal agencies around the country
- Barrier breakers identified by the same agencies
- Best practices and resources for breaking through the barriers
- You'll need to refer to the Barrier Breakers matrix for this module

Download "Benchmarking, Barriers and Best Practices" worksheets and checklists to be referenced in this section.

PDF file (180k)

Copyright © 2003. AFCEE. All rights reserved.

Start | SD Training Cou... | Web University ... | Microsoft Powe... | RE: Username ... | USAF: Sustain... | 10:24 AM

U.S. AIR FORCE

Staying Connected

- **Use the DoD E-mail List Servers**
  - **Sustainable Development:**
    "Sustain-Net"
    To join, send a blank e-mail to
    join-sustain-net@list.denix.osd.mil
  - **Green Purchasing:**
    "Buy-Green"
    To join, send a blank e-mail to
    join-buy-green@list.denix.osd.mil

- **Visit AFCEE's web pages**

AFCEE - Products - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://www.afcee.brooks.af.mil/products.asp Go Links

AFCEE Home | Search | Products & Services | Personnel

The Air Force Center for Environmental Excellence

Brooks City-Base, San Antonio, Texas

Products, Services and Resources

- Base Conversion
- Environmental
- Design and Construction
  - Guides, Specifications & Tools
  - Project Management Aids
  - Sustainable Development
  - USAF Design Awards Program
- Housing
- Medical MILCON
- Installation Planning
- Air Force Operations
- REO Offices

Business Links

- Business Opportunities
- Contracting Home Page
- Current AFCEE Contracts
- Decentralized Ordering

Featured Links

- Technology Transfer
- CAPP Toolbox
- Design and Construction
- Project Management Aids
- ERPIMS
- GeoBase
- Housing Privatization

Featured Sites

GEOBASE **Geospatial Information Resources**
HQ AFCEE is the leading agency charged with execution of the GeoBase programs for environmental issues and for MAJCOM oBase Initiatives.

ervices
esearch services to the U.S. Air Force, Air National Guard, Air Reserves, U.S. Air Force civilian employees and contractors who hold active environmental contracts with the U.S. Air Force.

PROACT Environmental Solutions, Technology & Guidance

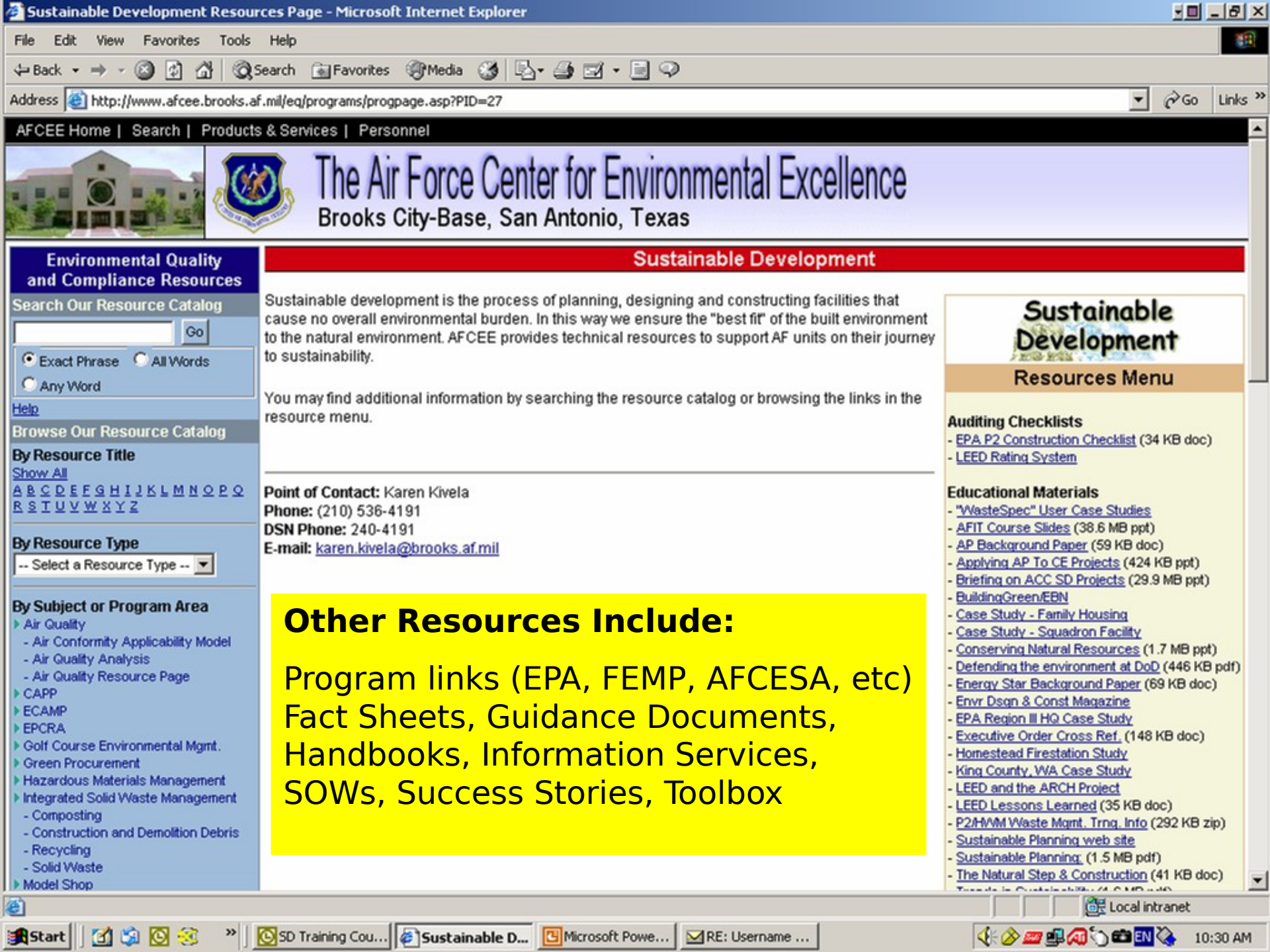
USAF Housing Privatization
The official USAF Housing Privatization website developed with the business community in mind. It is vital this public-private partnership be predictable and understandable to our industry partners.

Web University - Environmental Training
A USAF environmental education and online training website. WebU users can use the environmental master task list to identify training requirements, find or request training sources and get information needed to develop environmental training programs.

Technology Transfer
The Air Force Center for Environmental Excellence (AFCEE), through its Technology Transfer Program, offers an information avenue to help its customers traverse the myriad of choices for applying existing and innovative technologies in the fields of environmental restoration and pollution prevention.

http://www.afcee.brooks.af.mil/eq/programs/progpage.asp?PID=27 Local intranet

Start SD Training Cou... AFCEE - Produ... Microsoft Powe... RE: Username ... 10:28 AM


Sustainable Development Resources Page - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.afcee.brooks.af.mil/eq/programs/progpage.asp?PID=27
Go Links
AFCEE Home | Search | Products & Services | Personnel
The Air Force Center for Environmental Excellence
Brooks City-Base, San Antonio, Texas
Environmental Quality and Compliance Resources
Search Our Resource Catalog
Go
Exact Phrase All Words
Any Word
Help
Browse Our Resource Catalog
By Resource Title
Show All
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
By Resource Type
-- Select a Resource Type --
By Subject or Program Area
Air Quality
- Air Conformity Applicability Model
- Air Quality Analysis
- Air Quality Resource Page
CAPP
ECAMP
EPCRA
Golf Course Environmental Mgmt.
Green Procurement
Hazardous Materials Management
Integrated Solid Waste Management
- Composting
- Construction and Demolition Debris
- Recycling
- Solid Waste
Model Shop
Sustainable Development
Sustainable development is the process of planning, designing and constructing facilities that cause no overall environmental burden. In this way we ensure the "best fit" of the built environment to the natural environment. AFCEE provides technical resources to support AF units on their journey to sustainability.
You may find additional information by searching the resource catalog or browsing the links in the resource menu.
Point of Contact: Karen Kivela
Phone: (210) 536-4191
DSN Phone: 240-4191
E-mail: karen.kivela@brooks.af.mil
Other Resources Include:
Program links (EPA, FEMP, AFCESA, etc)
Fact Sheets, Guidance Documents,
Handbooks, Information Services,
SOWs, Success Stories, Toolbox
Sustainable Development
Resources Menu
Auditing Checklists
- EPA P2 Construction Checklist (34 KB doc)
- LEED Rating System
Educational Materials
- "WasteSpec" User Case Studies
- AFIT Course Slides (38.6 MB ppt)
- AP Background Paper (59 KB doc)
- Applying AP To CE Projects (424 KB ppt)
- Briefing on ACC SD Projects (29.9 MB ppt)
- BuildingGreen/EBN
- Case Study - Family Housing
- Case Study - Squadron Facility
- Conserving Natural Resources (1.7 MB ppt)
- Defending the environment at DoD (446 KB pdf)
- Energy Star Background Paper (69 KB doc)
- Envr Dsgn & Const Magazine
- EPA Region III HQ Case Study
- Executive Order Cross Ref. (148 KB doc)
- Homestead Firestation Study
- King County, WA Case Study
- LEED and the ARCH Project
- LEED Lessons Learned (35 KB doc)
- P2/HWM Waste Mgmt. Trng. Info (292 KB zip)
- Sustainable Planning web site
- Sustainable Planning: (1.5 MB pdf)
- The Natural Step & Construction (41 KB doc)
Local intranet
Start
SD Training Cou...
Sustainable D...
Microsoft Powe...
RE: Username ...
10:30 AM